"NATURAL RADAR" USED

THE flying bat at night employs "natural radar" to avoid colliding with trees and other obstacles. The little animal sends out cries, too shrill to be heard by the human ear, that help to locate things in its path, according to Dr. Robert Galambos of Rochester, N. Y., of the University of Rochester Medical School.

Bats move around almost in complete darkness in search of food—except for moon and starlight. That means they would collide with trees, bushes and fenceposts, unless they had some way to tell where such obstacles are located.

Although bats have eyes, they prefer to live and feed in darkness. The whole method used by the flying bat depends on the production of sound and the analysis of echoes. As the bat flies through the air, it emits a constant stream of high-pitched cries, which permeate the space in front of the animal. If there are any obstacles out there, like trees, branches or fenceposts, the sound is reflected or echoed back. The bat hears these echoes, change sits course, and fiies into regions which are echo-free.

Physicists have invented electronic devices for detecting the supersonic sounds of bats.

When Dr. Donald Griffin and Dr. Galambos were asking themselves whether bats produced a supersonic cry, they took the problem to Prof. G. W. Pierce, the expert in supersonic sound at Harvard, who turned over to them the laboratory space and equipment required for the experiment.

The instrument they needed the most was a so-called sonic amplifier, a device which converts supersonic sounds into audible ones. With it they were able to show that so long as bats fly, they emit a constant stream of cries in which frequencies around 50,000 cycles were particularly strong.

Humans cannot hear much above about 20,000 cycles. And as people grow older, the upper limit drops lower and lower, until at 60 or so, a person is deaf above about 6,000 cycles.

It was found that the bat emits a steady tat-tat-tat of about 30 supersonic cries a second as it cruises through the air. But when an obstacle lies ahead, this rate just about doubles momentarily, then drops back to 30 again when the obstacle is passed.

Dr. Griffin and Dr. Galambos watched about 100 bats and also experimented further to show the importance of the supersonic cry in another way. They tied the mouth of the animal closed and let the animal fly away. Those gagged animals were helpless in the air. But as soon as they cut the strings, each animal avoided obstacles once again.

The physicists also found that plugged ears were as dangerous as gags for the bats, the latter bumping into obstacles again. Fundamentally the same vocal structure produces supersonic cries in bats as produces speech in man.
